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The nature of extraordinary tsunami-like oscillations observed on island of Ist (Adriatic Sea)

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Devastating sea-level oscillations with crest-to-through heights up to 6 m, also known as meteotsunamis, have been sporadically reported in some bays/harbours in the Adriatic Sea. Their generation has been undoubtedly ascribed to high-frequency atmospheric disturbances propagating towards the east or northeast. Similar destructive waves, with crest-to-trough heights surpassing 4 m, stroke funnel-shaped Siroka Bay on island of Ist in the afternoon hours of 22 August 2007, causing significant material damage and injuring one tourist. Available air-pressure chart-records from the surrounding meteorological stations were digitized at 2 min resolution, and verified at available 10-min digital pressure records. The presence of an abrupt pressure drop (4 hPa/12 min) may be seen on the records, propagating over the coastal northern Adriatic towards east-northeast at the time of the occurrence of destructive ocean waves. The spectra indicate a substantial increase in energy at all frequencies during the passage of the disturbance. It is hypothesized that the air pressure disturbance generated barotropic ocean waves at the 50-70 m deep and about 200 km wide shelf through the Proudman resonance, and that these waves were additionally amplified upon hitting coastal areas and intensified to a destructive level by the harbour resonance. What makes a distinction of this event to the other Adriatic meteotsunami episodes is the fact that Siroka Bay is open to the southeast, protected from direct influence of open-ocean waves propagating from W or SW. Consequently, a possibility of wave reflection on nearby island of Molat arises, making this a unique opportunity to explore and numerically model such events. Also we will attempt to reproduce the generation mechanism

and propagation of the atmospheric disturbance by the WRF atmospheric model, and to compare the underlying dynamics with the 2003 middle Adriatic meteotsunami.